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10/810,792	03/26/2004	Kazuo Sugimoto	9683/180	9618

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EXAMINER	
HOLDER, ANNER N	
ART UNIT	PAPER NUMBER
2621	

MAIL DATE	DELIVERY MODE
02/02/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Supplemental Notice of Allowability	Application No.	Applicant(s)	
	10/810,792	SUGIMOTO ET AL.	
	Examiner	Art Unit	
	ANNER HOLDER	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *08/12/09*.

2. ☒ The allowed claim(s) is/are *21-24,26,29-40,42 and 44-47*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Tung Vo/
Primary Examiner, Art Unit 2621

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Karl Horlander on 12/17/09.

2. The application has been amended as follows:

a. Claims are to be amended as listed below - a line through indicates deletion; [[ ]] indicates removal/replacement, underline indicates addition to the claim.

21. A video encoding method comprising: dividing a coding target frame into a plurality of blocks, wherein each of the blocks corresponds to a predicted reference image to be generated; determining a motion vector for each of the blocks; extracting, for an operable block within the blocks, motion complexity information of the operable block ~~based upon the motion vector of the operable block and the motion vector of each of the blocks in the coding target frame that neighbor the operable block~~, wherein the motion complexity information of the operable block indicates a degree of complexity of movement between the operable block of the coding target frame and a corresponding block in a reference frame; determining, for the operable block, a number of funny position pixels to include in the predicted reference image

to be generated for the operable block based upon the motion complexity information of the operable block, wherein the determined number of funny position pixels included in the predicted reference image increases as the degree of complexity of movement of the operable block increases; and generating the predicted reference image for the operable block, wherein the predicted reference image for the operable block includes integer pixels located at integer pixel positions within the predicted reference image, interpolated pixels located at interpolated pixel positions within the predicted reference image, and the determined number of funny position pixels[[.]]; generating the predicted reference image corresponding to the coding target frame as a function of the motion vector determined for each of the blocks of the coding target frame; calculating a difference between the coding target frame and the predicted reference image for each of said blocks; converting the difference between the coding target frame and the predicted reference image for each of said blocks into a set of coefficients based upon a predetermined conversion rule; determining a number of non-zero coefficients in each set of coefficients for each of said blocks; and wherein extracting motion complexity information of the operable block comprises: determining a number of non-zero coefficients in the blocks that neighbor the operable block, wherein the motion complexity information of the operable block is based upon the number of non-zero coefficients in the blocks that neighbor

the operable block.

24. The video encoder method of claim 23, wherein the interpolated pixels are generated with an interpolation algorithm, and for each of the interpolated ~~interpolator~~ pixels, the interpolator algorithm including a high-frequency cutoff characteristic; wherein the funny position pixels are generated with a low-pass filter, wherein the low-pass filter includes a high-frequency cutoff characteristic; and wherein for a respective funny position pixel of the funny position pixels, the high-frequency cutoff characteristic of the low-pass filter used to generate the respective funny position pixel is less than the high-frequency cutoff characteristic of the interpolator algorithm used to generate the interpolated pixels that neighbor the respective funny position pixel.

26. The video encoding method of claim 21, wherein determining, for the operable block, the determined number of funny position pixels to include in the predicted reference image, further comprises: determining whether the degree of complexity of movement of the operable block exceeds a threshold; and in response to determination that the degree of complexity of movement of the operable block exceeds the threshold, selecting the determined number of funny position pixels to be greater than one.

31. The video encoding method of claim 30, wherein the determined number of funny pixels includes a funny position pixel located at a funny position location, and wherein generating the determined number of funny position pixels further comprises: calculating the pixel value for the funny position pixel based upon the integer pixels located in a horizontal line of pixels of the coding target frame that are spatially closest to the funny position location[[s]] of the funny position pixel.

32. A computer readable media comprising: computer program code executable on a processor, the computer program code including instructions to: divide a coding target frame into a plurality of blocks, wherein each of the blocks corresponds to a predicted reference image to be generated; determine a motion vector for each of the blocks; extract, for an operable block within the blocks, motion complexity information of the operable block ~~based upon the motion vector of the operable block and the motion vector of each of the blocks in the coding target frame that neighbor the operable block~~, wherein the motion complexity information of the operable block indicates a degree of complexity of movement between the operable block of the coding target frame and a corresponding block in a reference frame; determine, for the operable block, a number of funny position pixels to include in the predicted reference image to be generated for the operable block based upon

the motion complexity information of the operable block, wherein the determined number of funny position pixels included in the predicted reference image increases as the degree of complexity of movement of the operable block increases; ~~and~~ generate the predicted reference image for the operable block, wherein the predicted reference image for the operable block includes integer pixels located at integer pixel positions within the predicted reference image, interpolated pixels located at interpolated pixel positions within the predicted reference image, and the determined number of funny position pixels[[.]]; generate the predicted reference image corresponding to the coding target frame as a function of the motion vector determined for each of the blocks of the coding target frame; calculate a difference between the coding target frame and the predicted reference image for each of said blocks; convert the difference between the coding target frame and the predicted reference image for each of said blocks into a set of coefficients based upon a predetermined conversion rule; and wherein the instructions to extract the motion complexity information of the operable block comprises instructions to determine a number of non-zero coefficients in said blocks that neighbor the operable block, wherein the motion complexity information of the operable block is based upon the number of non-zero coefficients in said blocks that neighbor the operable block.

34. The computer readable media of claim 32, further comprising instructions to: generate a predicted reference image corresponding to the coding target frame as a function of the motion vector determined for each of the blocks of the coding target frame; calculate a difference between the coding target frame and the predicted reference image for each of said blocks; convert the difference between the coding target frame and the predicted reference image for each of said blocks into a set of coefficients based upon a predetermined conversion rule; determine the number of non-zero coefficients in each set of coefficients for each of said blocks; and determine a number of non-zero coefficients in said blocks that neighbor the operable block, wherein the complexity information of the operable block is based upon the number of non-zero coefficients.

38. A video decoding method comprising: dividing a decoding target frame into a plurality of blocks, wherein each of the blocks corresponds to a predicted reference image to be generated; decoding a compressed data stream to generate a motion vector for an operable block and a motion vector for each of the blocks in the decoding target frame that surround the operable block in the decoding target frame; extracting, for an operable block within the blocks, motion complexity information of the operable block ~~based upon the motion vector of the operable block and the motion vector for each of the~~

~~blocks in the decoding target frame that surround the operable block~~, wherein the complexity information of the operable block indicates a degree of complexity of movement between the operable block of the decoding target frame and a corresponding block in a reference frame; determining, for the operable block, a number of funny position pixels to include in the predicted reference image to be generated for the operable block based upon the motion complexity information of the operable block, wherein the number of funny position pixels included in the predicted reference image increases as the degree of complexity of movement of the operable block increases; ~~and~~ generating the predicted reference image for the operable block based upon ~~reference~~ integer pixels of the corresponding block in the reference frame, ~~the reference~~ integer pixels of blocks in the reference frame that surround the corresponding block, the motion vector of the operable block, and the motion vector of each of the blocks that surround the operable block in the decoding target frame, wherein the predicted reference image for the operable block includes integer pixels located at integer pixel positions within the predicted reference image, interpolated pixels located at interpolated pixel positions within the predicted reference image, and the determined number of funny position pixels[[.]]; generating the predicted reference image corresponding to the decoding target frame as a function of the motion vector determined for each of the blocks of the decoding target frame; calculating a difference

between the decoding target frame and the predicted reference image for each of said blocks; converting the difference between the decoding target frame and the predicted reference image for each of said blocks into a set of coefficients based upon a predetermined conversion rule; and wherein extracting motion complexity information of the operable block comprises: determining a number of non-zero coefficients in said blocks that neighbor the operable block, wherein the complexity information of the operable block is based upon the number of non-zero coefficients in said blocks that neighbor the operable block.

39. (Previously Presented) The video decoding method of claim 38, wherein generating the predicted reference image for the operable block further comprises: generating the interpolated pixels to include in the predicted reference image for the operable block, wherein the interpolated pixels are based upon the reference pixels of the corresponding block in the reference frame and reference pixels of blocks in the reference frame that surround the corresponding block.

42. (Currently Amended) The video decoding method of claim 38, wherein determining, for the operable block, the number of funny position pixels to include in the predicted reference image, further comprises: determining

whether the degree of complexity of movement of the operable block exceeds a threshold; and in response to determination that the degree of complexity of movement of the operable block exceeds the threshold, selecting the determined number of funny position pixels to be greater than one.

47. A computing system comprising: a storage medium including stored therein a plurality of executable instructions; and a[[n]] processor coupled to the storage medium, the processor configured to execute at least a subset of the plurality of executable instructions to implement a method according to claim 38.

b. Further the claims are amended to reflect the renumbering to place them in numerical order as follows

i. Claim 26 should be changed to Claim 25.

ii. Claim 29 should be changed to Claim 26.

iii. Claim 30 should be changed to Claim 27.

iv. Claim 31 should be changed to Claim 28. Further the claim should be changed to read as follows at line 5 page 5: adding "The video encoding method of claim 27," deleting "The video encoding method of claim 30,"

v. Claim 32 should be changed to Claim 29.

vi. Claim 33 should be changed to Claim 30. Further the claim

should be changed to read as follows at line 1 page 7: adding "The computer readable media of claim 29," deleting "The computer readable media of claim 32,"

vii. Claim 34 should be changed to Claim 31. Further the claim should be changed to read as follows at line 7 page 7: adding "The computer readable media of claim 29," deleting "The computer readable media of claim 32,"

viii. Claim 35 should be changed to Claim 32. Further the claim should be changed to read as follows at line 1 page 8: adding "The computer readable media of claim 29," deleting "The computer readable media of claim 32,"

ix. Claim 36 should be changed to Claim 33. Further the claim should be changed to read as follows at line 10 page 8: adding "The computer readable media of claim 29," deleting "The computer readable media of claim 32,"

x. Claim 37 should be changed to Claim 34. Further the claim should be changed to read as follows at line 21 page 8: adding "The computer readable media of claim 29," deleting "The computer readable media of claim 32,"

xi. Claim 38 should be changed to Claim 35.

xii. Claim 39 should be changed to Claim 36. Further the claim

should changed to read as follows at line 1 page 11: adding "The video decoding method of claim 35," deleting "The video decoding method of claim 38,"

xiii. Claim 40 should be changed to Claim 37. Further the claim should be changed to read as follows at line 8 page 11: adding "The video decoding method of claim 35," deleting "The video decoding method of claim 38,"

xiv. Claim 42 should be changed to Claim 38. Further the claim should be changed to read as follows at line 22 page 11: adding "The video decoding method of claim 35," deleting "The video decoding method of claim 38,"

xv. Claim 44 should be changed to Claim 39. Further the claim should be changed to read as follows at line 11 page 12: adding "The video decoding method of claim 35," deleting "The video decoding method of claim 38,"

xvi. Claim 45 should be changed to Claim 40. Further the claim should be changed to read as follows at line 20 page 12: adding "The video decoding method of claim 39," deleting "The video decoding method of claim 44,"

xvii. Claim 46 should be changed to Claim 41. Further the claim should be changed to read as follows at lines 5-7 page 13: adding "A

tangible computer readable media comprising: computer program code executable on a processor, the computer program code including instructions to implement the method according to claim 35." deleting "A tangible computer readable media comprising: computer program code executable on a processor, the computer program code including instructions to implement the method according to claim 38."

xviii. Claim 47 should be changed to Claim 42. Further the claim should be changed to read as follows at lines 9-13 page 13: adding "A computing system comprising: a storage medium including stored therein a plurality of executable instructions; and a[[n]] processor coupled to the storage medium, the processor configured to execute at least a subset of the plurality of executable instructions to implement a method according to claim 35." deleting "A computing system comprising: a storage medium including stored therein a plurality of executable instructions; and a[[n]] processor coupled to the storage medium, the processor configured to execute at least a subset of the plurality of executable instructions to implement a method according to claim 38."

Allowable Subject Matter

3. Claims 21-24, 26, 29, 30-31, 32-40, 42, and 44-47 are allowed.

The following is an examiner's statement of reasons for allowance: The cited

prior art fails to teach the applicant's claimed invention as follows: blocks corresponds to a predicted reference image to be generated; determining a motion vector for each of the blocks; extracting, for an operable block within the blocks, motion complexity information of the operable block, wherein the motion complexity information of the operable block indicates a degree of complexity of movement between the operable block of the coding target frame and a corresponding block in a reference frame; determining, for the operable block, a number of funny position pixels to include in the predicted reference image to be generated for the operable block based upon the motion complexity information of the operable block, wherein the determined number of funny position pixels included in the predicted reference image increases as the degree of complexity of movement of the operable block increases; generating the predicted reference image for the operable block, wherein the predicted reference image for the operable block includes integer pixels located at integer pixel positions within the predicted reference image, interpolated pixels located at interpolated pixel positions within the predicted reference image, and the determined number of funny position pixels; generating the predicted reference image corresponding to the coding target frame as a function of the motion vector determined for each of the blocks of the coding target frame; calculating a difference between the coding target frame and the predicted reference image for each of said blocks; converting

the difference between the coding target frame and the predicted reference image for each of said blocks into a set of coefficients based upon a predetermined conversion rule; determining a number of non-zero coefficients in each set of coefficients for each of said blocks; and wherein extracting motion complexity information of the operable block comprises: determining a number of non-zero coefficients in the blocks that neighbor the operable block, wherein the motion complexity information of the operable block is based upon the number of non-zero coefficients in the blocks that neighbor the operable block.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNER HOLDER whose telephone number is (571)270-1549. The examiner can normally be reached on M-W, M-W 8 am-3 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anner Holder/
Examiner, Art Unit 2621

/Tung Vo/
Primary Examiner, Art Unit 2621